

DISCUSSION

This colored shaded-relief bathymetry map of the Offshore of Point Conception map area in southern California was generated from acoustic-bathymetry data collected by Fugro Pelagos (fig. 1) in 2008, using a combination of 400-kHz Reson 7125, 240-kHz Reson 8101, and 100-kHz Reson 8111 multibeam echosounders. In addition, bathymetric- and topographic-lidar data was collected in the nearshore and coastal areas by the U.S. Army Corps of Engineers (USACE) Joint Lidar Bathymetry Technical Center of Expertise in 2009 and 2010. These mapping missions combined to provide continuous bathymetry from the shoreline to the 3-nautical-mile limit of California's State Waters.

During the Fugro Pelagos mapping missions, an Applanix POS-MV (Position and Orientation System for Marine Vessels) was used to accurately position the vessels during data collection, and it also accounted for vessel motion such as heave, pitch, and roll, with navigational input from GPS receivers. Smoothed Best Estimated Trajectory (SBET) files were postprocessed from lagged POS-MV files. Sound-velocity profiles were collected with an Applied Microsystems (AM) SVPlus sound velocimeter. Soundings were corrected for vessel motion using the Applanix POS-MV data, for variations in water-column sound velocity using the AM SVPlus data, and for variations in water height (tide) and heave using the postprocessed SBET data (California State University, Monterey Bay, Seafloor Mapping Lab, 2016).

Nearshore bathymetric-lidar data and acoustic-bathymetric data from within California's State Waters were merged together as part of the 2013 National Oceanic and Atmospheric Administration (NOAA) Coastal California TopoBathy Merge Project (National Oceanic and Atmospheric Administration, 2013). Merged bathymetry data from within the Offshore of Point Conception map area were downloaded from this dataset and resampled to 2-m spatial resolution. An illumination having an azimuth of 300° and from 45° above the horizon was then applied to the bathymetric surface to create the shaded-relief imagery. In addition, a modified "rainbow" color ramp was applied to the bathymetry data, using reds to represent shallower depths, and greens to represent greater depths (note that the Offshore of Point Conception map area requires only the shallower part of the full-rainbow color ramp used on some of the other maps in the California State Waters Map Series; see, for example, Kvitck and others, 2012). This colored bathymetry surface was draped over the shaded-relief imagery at 60-percent transparency to create the colored shaded-relief map. Note that the ripple patterns and parallel lines that are apparent within the map area are data-collection and -processing artifacts. These various artifacts are made obvious by the hillshading process.

Bathymetric contours were generated at 10-m intervals from a modified 2-m-resolution bathymetric surface. The most continuous contour segments were preserved; smaller segments and isolated island polygons were excluded from the final output. The contours were smoothed using a polynomial approximation with exponential kernel algorithm and a tolerance value of 60 m. The contours were then clipped to the boundary of the map area.

The onshore-area image was generated by applying the same illumination (azimuth of 300° and from 45° above the horizon) to 2-m-resolution topographic-lidar data from National Oceanic and Atmospheric Administration Office for Coastal Management's Digital Coast (available at <http://www.csc.noaa.gov/digitalcoast/data/coastalidar/>) and to 10-m-resolution topographic-lidar data from the U.S. Geological Survey's National Elevation Dataset (available at <http://ned.usgs.gov/>).

REFERENCES CITED

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Kvitck, R.G., Phillips, E.L., and Dartnell, P., 2012, Colored shaded-relief bathymetry, Huemene Canyon and vicinity, California, sheet 1, in Johnson, S.Y., Dartnell, P., Cochran, C.R., Golden, M.E., Phillips, E.L., Ritchie, A.C., Kvitck, R.G., Greene, H.G., Krigman, L.M., Endris, C.A., Clahan, K.B., Slier, R.W., Wong, F.L., Voklavich, M.M., and Normark, W.R. (S.Y. Johnson, ed.), California State Waters Map Series—Huemene Canyon and vicinity, California, U.S. Geological Survey Scientific Investigations Map 3225, pamphlet 41 p., 12 sheets, available at <http://pubs.usgs.gov/sim/3225/>.
National Oceanic and Atmospheric Administration, 2013, 2013 NOAA Coastal California TopoBathy Merge Project, National Oceanic and Atmospheric Administration, National Centers for Environmental Information database, accessed August 2016 at http://www.ngdc.noaa.gov/doccomp/page?cm=NOAA/NESDIS/NGDC/MGG/Lidar/iso/xml/2013_CA_TopBathy_n2612.xml&view=getDataView&header=none.

EXPLANATION

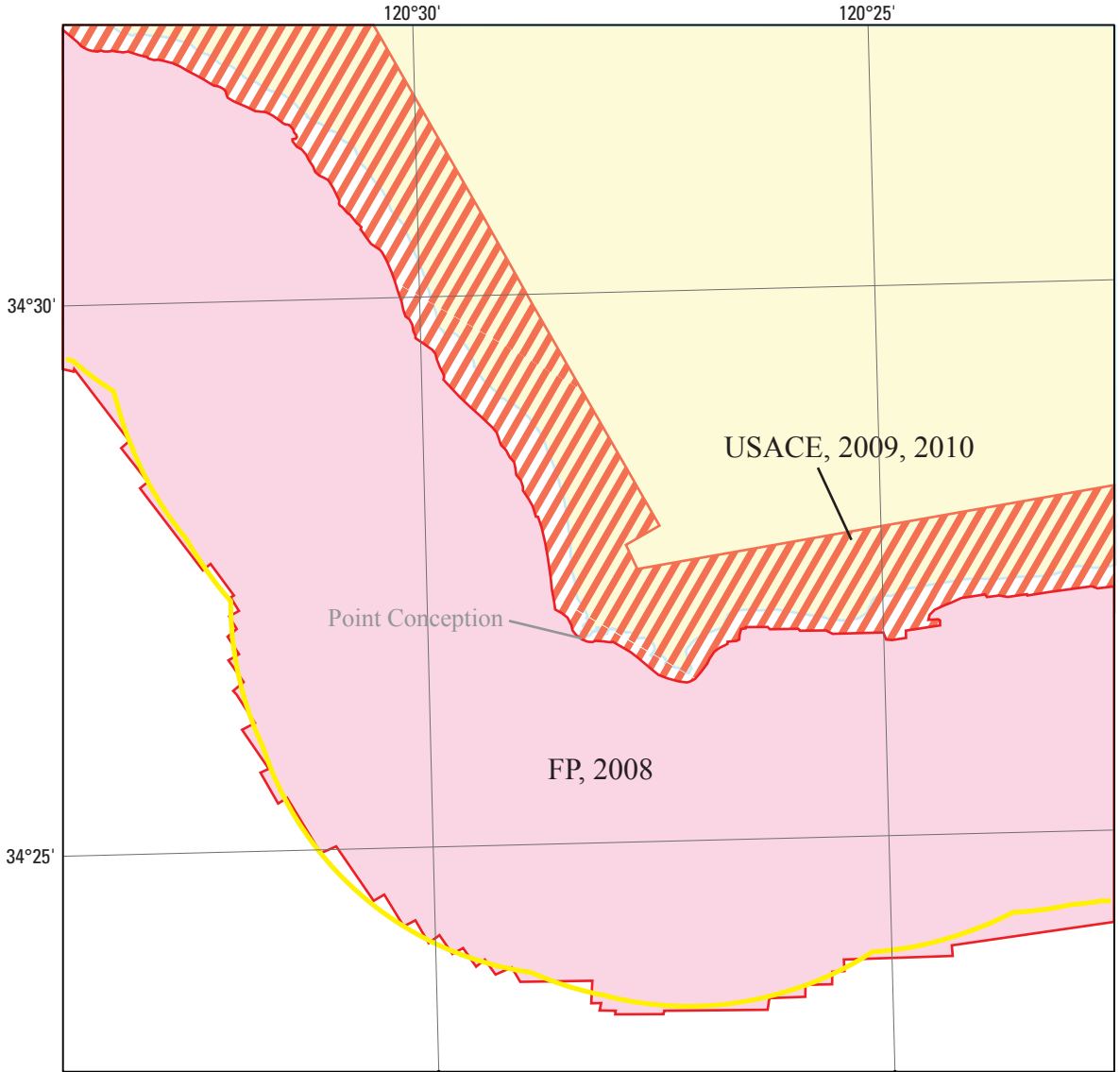
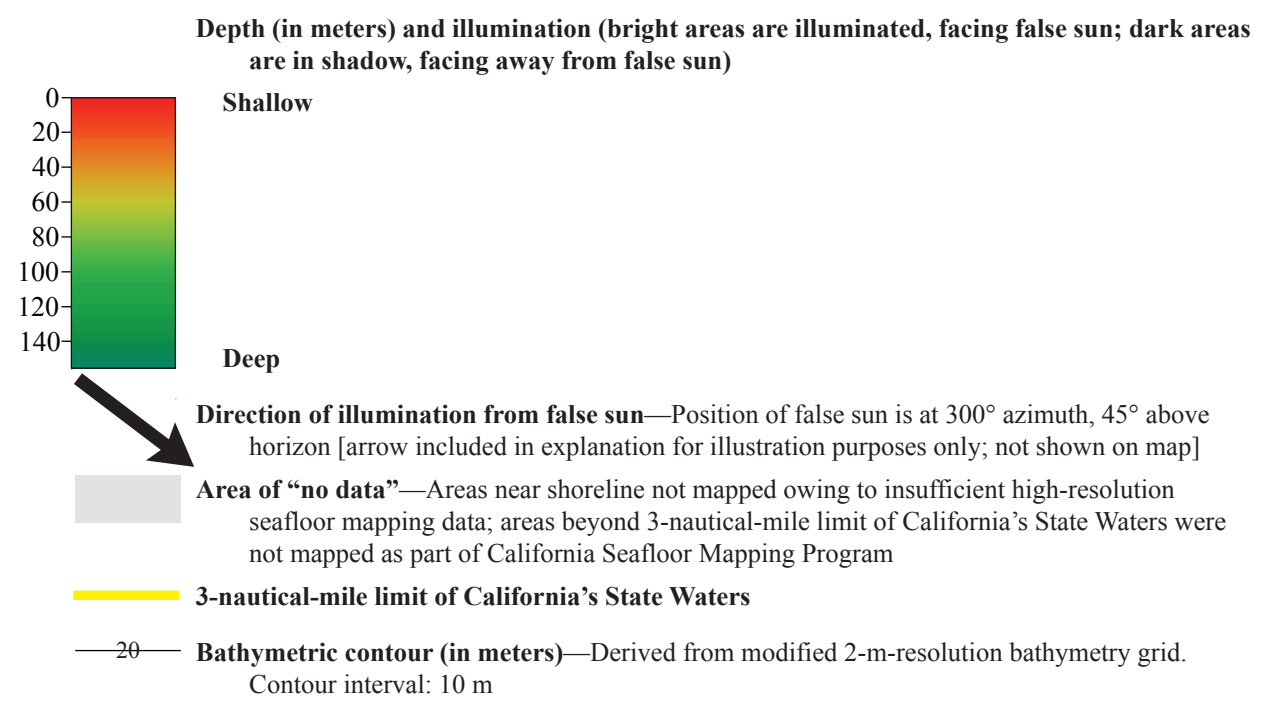
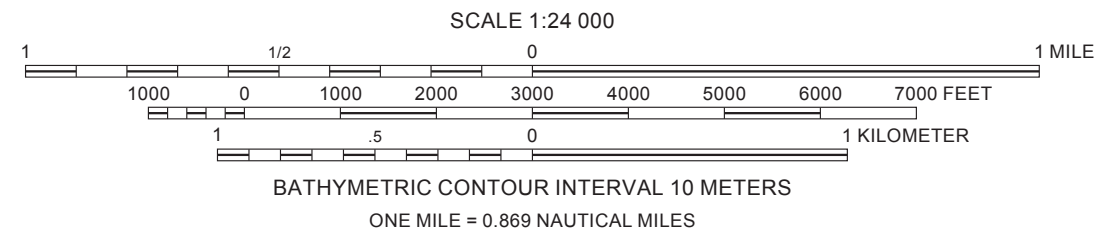
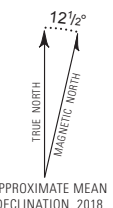


Figure 1. Map showing areas of multibeam-echosounder surveys (pink shading), bathymetric- and topographic-lidar surveys (orange diagonal lines), and publicly available onshore topographic-lidar data (yellow shading). Also shown are data-collecting agencies (FP, Fugro Pelagos; USACE, U.S. Army Corps of Engineers) and dates of surveys if known.

Onshore elevation data from National Oceanic and Atmospheric Administration (NOAA) Office for Coastal Management's Digital Coast (available at <http://www.csc.noaa.gov/digitalcoast/data/coastalidar/>) and from U.S. Geological Survey's National Elevation Dataset (available at <http://ned.usgs.gov/>). California's State Waters limit from NOAA Office of Coast Survey.
Universal Transverse Mercator projection, Zone 10N.
NOT INTENDED FOR NAVIGATIONAL USE



Shaded-relief bathymetry by Peter Dartnell, 2016 (data collected by Fugro Pelagos in 2008 and by U.S. Army Corps of Engineers (USACE) Joint Lidar Bathymetry Technical Center of Expertise in 2009 and 2010). Bathymetric contours by Peter Dartnell, 2016.
GIS database and digital cartography by Nadine E. Golden and Stephen R. Hartwell.
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Colored Shaded-Relief Bathymetry, Offshore of Point Conception Map Area, California

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